

The Micro Impact of Macroprudential Policies: Firm-Level Evidence

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Objectives and contribution

Macroprudential policies have received increased attention post-GFC.

These policies are intended to: (a) increase the resilience of financial institutions and borrowers to aggregate shocks and (b) to contain the build-up of systemic vulnerabilities (IMF, 2013).

Literature has explored the effect of macroprudential policies on the aggregate economy and bank-level credit (Cerutti et al., 2015; Claessens et al., 2013; Akinci and Olmstead-Rumsey, 2015),

But lack of evidence on the relationship between macroprudential policies and firm outcomes.

This paper's objectives:

1. Assess the effectiveness of macroprudential policies in reducing firm credit and their impact on firms' investment and sales growth.
2. Explore the distributional consequences of macroprudential policies by examining how they affect different firms => Are the most bank dependent and financially constrained firms most affected?

Data

We combine 2 main databases:

- A. Firm-level balance sheet data from Orbis covering 900,000 firms from 49 countries during 2003-2011.
- B. Panel data on the use of different macroprudential tools from the Global Macroprudential Policy Instruments (GMPI), as described in Cerutti et al. (2015).

The GMPI database distinguishes between (i) tools targeted at borrowers' leverage and financial positions (BOR) and (ii) tools targeted at financial institutions (FIN).

BOR includes loan to value (LTV) and debt service to income (DSTI) ratios.

FIN includes instruments: (1) dynamic loan-loss provisioning; (2) countercyclical capital buffers; (3) bank leverage ratio; (4) capital surcharge for systemically important financial institutions; (5) limits on interbank exposures; (6) concentration limits; (7) limits on foreign currency loans; (8) limits on domestic currency loans; (9) reserve requirement ratios; and (10) taxes or levies on financial institutions.

Each instrument is coded as 1 or 0 for each country-year depending on whether it was in use or not.

Methodology – Financing growth - Baseline

To assess the relationship between macroprudential policies and growth in firms' financing, we start by estimating equation (1):

$$\text{Financing growth}_{ijt} = \beta_1 \text{Macropru}_{jt-1} + \beta_2 \text{Macro}_{jt-1} + \beta_3 \text{GFC}_t + \beta_4 \text{Log of Assets}_{it} + \eta_i + \varepsilon_{ijt} \quad (1)$$

where i denotes the firm, j the country and t the year.

Financing growth: short-term financing (< 1 year), long-term financing (>1 year) or total financing.

Macropru: indexes of macroprudential policies (MPI, BOR or FIN)

Macro: real monetary policy rate and GDP growth.

GFC: crisis dummy (2008-2009)

η_i : firm fixed effects

Methodology – Financing growth – Heterogeneity across size/age

To control for country-time varying factors and to test for differences across firms we estimate equation (2):

$$\text{Financing growth}_{ijt} = \beta_1 \text{Macropru}_{jt-1} * \text{Firm size/age}_i + \mu_{jt} + \eta_i + \varepsilon_{ijt} \quad (2)$$

where *Firm size/age*

- Size: Micro (<10 employees), SMEs (10-249 employees), MSMEs (<250 employees)
- Age: Young (≤ 3 years)

μ_{jt} represent country-year fixed effects

η_i : firm fixed effects

Robustness:

- (1) Include interactions of macro variables (GDP growth and monetary rate) with firm characteristics
- (2) Use intensity measures of macropru policies (only for BOR)
- (3) Control for measures of firm financial health (leverage, profitability, and interest coverage).

Methodology - Financing growth – Exploring role of financial health

To assess whether financially weaker firms within a size or age category are differentially affected we estimate equation (3) for Micro, SMEs and Young firms separately

$$\text{Financing growth}_{ijt} = \beta_1 \text{Macropru}_{jt-1} * \text{Firm financial health}_{it} + \beta_2 \text{Financial health}_{it} + \mu_{jt} + \eta_i + \varepsilon_{ijt} \quad (3)$$

Where *Financial health*

- *Leverage*: Debt to assets ratio
- *Interest coverage*: 1 if EBIT to interest expenses <1
- *ROA*: return to assets ratio

The purpose of these estimations is to examine whether among small and young firms financially weakest firms are most affected by macroprudential policies, consistent with a financial stability objective.

Methodology – Real firm growth

To investigate the real consequences of macropru measures we estimate:

$$Firm\ growth_{ijt} = \beta_1 Macropru_{jt-1} + \beta_2 Macro_{jt-1} + \beta_3 GFC_t + \beta_4 Log\ of\ Assets_{it} + \eta_i + \varepsilon_{ijt} \quad (1)$$

$$Firm\ growth_{ijt} = \beta_1 Macropru_{jt-1} * Firm\ size/age_i + \mu_{jt} + \eta_i + \varepsilon_{ijt} \quad (2)$$

Where *Firm growth*: sales growth and investment

Other variables are defined as above

Summary of results – Firm financing

- There is a significant and negative association between BOR and firms' long-term financing growth.
 - Applying one additional BOR tool is associated with 4.8% lower long-term financing growth.
- Micro, small and medium sized firms (MSMEs)' growth in short- and long-term financing decreases more (relative to large firms) with the additional implementation of BOR tools.
- The association between BOR tools and long-term financing growth is more negative for younger firms.
- Not only the implementation, but also the intensity of macroprudential tools is negatively and significantly associated with firms' financing growth.
- Among MSMEs and young firms, less financially healthy firms are more affected by the implementation of macroprudential policies.
 - Highly levered firm, less profitable firms and firms with low interest coverage experience stronger reductions in financing growth than other firms after the implementation of macroprudential policies.

Summary of results – Firm real outcomes

- Macroprudential policies are also associated with real sector outcomes.
- Specifically, applying one additional BOR macroprudential tool is associated with a 5.3% lower investment and 4.4% lower sales growth.
- The link between macroprudential tools and investment and sales growth is stronger for MSMEs and for younger firms.

Conclusions

- Macroprudential tools affect firms' financing, investment and sales growth, speaking for their effectiveness.
- Borrower-targeted policies rather than measures targeted at banks are most effective, consistent with previous findings that macroprudential measures targeted at banks are subject to leakage or circumvention (Aiyar et al., 2014).
- The effectiveness of macroprudential tools works primarily through reducing financing growth for MSMEs and young firms that have fewer alternative financing sources.
- This finding is consistent with the literature that has found that small firms are more affected by policy changes (Gertler and Gilchrist, 1994; Forbes, 2007) and, furthermore, seemingly points to a trade-off between financial stability and financial inclusion.
- Reassuringly, however, banks seem to be reducing financing growth primarily to riskier (more financially fragile) firms.